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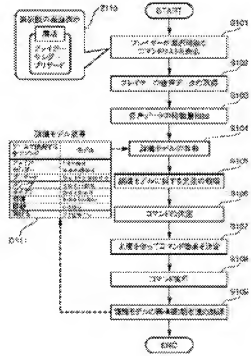
(54) ELECTRONIC GAME DEVICE, AND PROCESSING METHOD FOR ELECTRONIC GAME DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a game wherein the personal characteristics of a game player are reflected.
SOLUTION: The electronic game device advances the game conforming to commands indicated by the player. Such an electronic game device is equipped with a receiving means, a storage means, a calculating means, a selecting means, a setting means, and a processing means. In this case, the receiving means receives the commands in voice. The storage means stores sound recognizing models for respective commands. The calculating means calculates similarities between the voices and respective sound recognizing models. The selecting means selects the command to be executed based on the calculated similarity. The setting means sets a parameter which is used for a process corresponding with the selected command based on the similarity. The processing means executes the process corresponding with the command by the set parameter.



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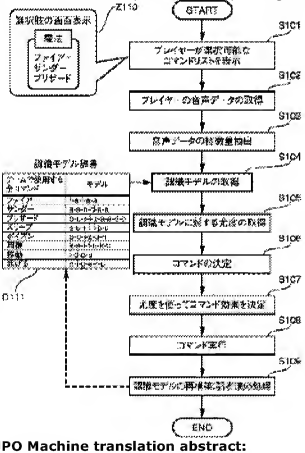
PROBLEM TO BE SOLVED: To provide a game wherein the personal characteristics of a game player are reflected.SOLUTION: The electronic game device advances the game conforming to commands indicated by the player. Such an electronic game device is equipped with a receiving means, a storage means, a calculating means, a selecting means, a setting means, and a processing means. In this case, the receiving means receives the commands in voice. The storage means stores sound recognizing models for respective commands. The calculating means calculates similarities between the voices and respective sound recognizing models. The selecting means selects the command to be executed based on the calculated similarity. The setting means sets a parameter which is used for a process corresponding with the selected command based on the similarity. The processing means executes the process corresponding with the command by the set parameter.



JPO Machine translation abstract:
(57) **Abstract**
SUBJECT It aims at providing the game reflecting the individuality of the game player.
Means for SolutionA receiving means which is an electronic game device which runs a game according to a command directed from a player, and receives said command with a sound, A memory measure which memorizes a speech recognition model for every command, and a calculating means which computes similarity of said sound and said speech recognition model of each, A selecting means which chooses said command to execute based on said computed similarity, Based on said similarity, it has a setting-out means to set a parameter used by

processing corresponding to said selected command, and a processing means to perform processing corresponding to said command with said set parameter.

Claim(s)

Claim 1 An electronic game device which runs a game according to a command directed from a player, comprising:
A receiving means which receives said command with a sound.
A memory measure which memorizes a speech recognition model for every command.
A calculating means which computes similarity of said sound and said speech recognition model of each.
A selecting means which chooses said command to execute based on said computed similarity, a setting-out means to set a parameter used by processing corresponding to said selected command based on said similarity, and a processing means to perform processing corresponding to said command with said set parameter.

Claim 2 The electronic game device according to claim 1, wherein said selecting means chooses a command from which similarity serves as the maximum among similarity computed for said every command as an execute command.
Claim 3 The electronic game device according to claim 1 having further an alteration means which changes said speech recognition model based on a sound from a player.
Claim 4 The electronic game device according to claim 2 having further an alteration means which changes said speech recognition model based on a sound from a player.
Claim 5 Said speech recognition model is further provided with dignity for every command, and said selecting means, The electronic game device according to claim 1 having further a selecting means with dignity which chooses a command based on dignity for every command of said speech recognition model, and similarity computed by said calculating means.
Claim 6 Said speech recognition model is further provided with dignity for every command, and said selecting means, The electronic game device according to claim 3 having further a selecting means with dignity which chooses a command based on dignity for every command of said speech recognition model, and similarity computed by said calculating means.
Claim 7 Said selecting means is further provided with a random selecting means which uses a command extracted from said speech recognition model at random as a selected execute command, and said setting-out means, The electronic game device according to claim 1 having further a random setting-out means to set a parameter based on a value of similarity to a speech recognition model extracted at random by said random selecting means.
Claim 8 Said selecting means is further provided with a random selecting means which uses a command extracted from said speech recognition model at random as a selected execute command, and said setting-out means, The electronic game device according to claim 3 having further a random setting-out means to set a parameter based on a value of similarity to a speech recognition model extracted at random by said random selecting means.
Claim 9 An electronic game device of any one statement of claim 3 having further an adding means which adds a new game command if a speaker adaptation level in which a degree changed by said alteration means is shown is judged and a predetermined speaker adaptation level is exceeded, claim 4, claim 6, or claim 8.
Claim 10 Said calculating means is further provided with a mean value calculating means which computes beforehand average value of similarity of each command for every player, and said setting-out means, An electronic game device of any one statement of claim 2 characterized by setting a parameter based on a difference of average value of similarity computed by said mean value calculating means, and similarity computed by said calculating means thru/or claim 9.
Claim 11A disposal method characterized by comprising the following in an electronic game device which runs a game according to a command directed from a player.
A reception process of receiving said command with a sound.
A memory process of memorizing a speech recognition model for every command.
A calculating process which computes similarity of said sound and said speech recognition model of

each.
A selection process which chooses said command to execute based on said computed similarity, a setting-out process of setting a parameter used by processing corresponding to said selected command based on said similarity, and down stream processing which performs processing corresponding to said command with said set parameter.

Claim 12A disposal method in the electronic games according to claim 11, wherein said selection process chooses a command from which similarity serves as the maximum among similarity computed for said every command as an execute command.
Claim 13A disposal method in the electronic games according to claim 11 having further a change process of changing said speech recognition model based on a sound from a player.
Claim 14A disposal method in the electronic games according to claim 12 having further a change process of changing said speech recognition model based on a sound from a player.
Claim 15 Said speech recognition model is further provided with dignity for every command, and said selection process, A disposal method in the electronic games according to claim 11 having further a selection process with dignity which chooses a command based on dignity for every command of said speech recognition model, and similarity computed by said calculating process.
Claim 16 Said speech recognition model is further provided with dignity for every command, and said selection process, A disposal method in the electronic games according to claim 13 having further a selection process with dignity which chooses a command based on dignity for every command of said speech recognition model, and similarity computed by said calculating process.
Claim 17 Said selection process is further provided with a random selection process which uses a command extracted from said speech recognition model at random as a selected execute command, and said setting-out process, A disposal method in the electronic games according to claim 11 having further a random setting-out process of setting a parameter based on a value of similarity to a speech recognition model extracted at random according to said random selection process.
Claim 18 Said selection process is further provided with a random selection process which uses a command extracted from said speech recognition model at random as a selected execute command, and said setting-out process, A disposal method in the electronic games according to claim 13 having further a random setting-out process of setting a parameter based on a value of similarity to a speech recognition model extracted at random according to said random selection process.
Claim 19A speaker adaptation level in which a degree changed by said change process is shown is judged, A disposal method in electronic games of any one statement of claim 3 having like additional processing which adds a new game command further if a predetermined speaker adaptation level is exceeded, claim 4, claim 6, or claim 8.
Claim 20 Said calculating process is further provided with an averaging process of computing beforehand average value of similarity of each command for every player, and said setting-out process, A disposal method in electronic games of any one statement of claim 2 characterized by setting a parameter based on a difference of average value of similarity computed by said averaging process, and similarity computed by said calculating process thru/or claim 9.
Claim 21A storage which stored a control program for realizing a disposal method in electronic games of any one statement of claim 11 thru/or claim 20 by computer.
Claim 22A control program for realizing a disposal method in electronic games of any one statement of claim 11 thru/or claim 20 by computer.

Detailed Description of the Invention
0001
Field of the Invention This invention relates to the electronic game device which used speech recognition.
0002
Description of the Prior Art Conventionally, JP,6-6175689,A, JP,9-173642,A, etc. are proposed as a device which operates based on voice input instructions. This device has taken in speech recognition technology that it should opt for operation using the similarity of the characteristic

quantity of the result audio volume and loudness, and speech recognition's, and a user's sound, and the characteristic quantity of each sound in a voice dictionary, etc. For example, in the case of the robot type toy using speech recognition technology, it has opted for operation using the result of above-mentioned speech recognition, and similarity. For this reason, carrying out operation from which a robot type toy differs depending on the method of a user's utterance etc. can diversify how to use a toy. The game which took in speech recognition technology is also proposed.

0003 However, the effect of the command in a game is chiefly defined by the game side, and the individuality of each player is not reflected.

0004 For example, in the conventional computer game the effect of the command (work and magic) in a game, The timing of improvement in the character which it is set up using the random number etc. and a user operates, and the timing to which the difficulty of the game itself is changed were also dependent on the game program chiefly.

0005 In the concrete example, the effect at the time of execution of the aforementioned command was decided by RPG of TV game in most ranges. About improvement in the aforementioned character, or the timing of change of difficulty, it was dependent only on the game program to integrate the experience value of a character in a game, and for the level of a character to go up, if a value with an experience value is reached, or to memorize new magic and command etc.

0006 For this reason, even if who operated it, it became the method of the same improvement, and an effect of the same command, and the original nature of each player did not come out in game deployment.

0007

Problem(s) to be Solved by the Invention This invention was made in order to solve an aforementioned problem, and an object of this invention is to provide the game reflecting the individuality of the game player.

0008

Means for Solving the Problem In order to solve this SUBJECT, an electronic game device of this invention is provided with the following composition, for example. Namely, a receiving means which is an electronic game device which runs a game according to a command directed from a player, and receives said command with a sound, A memory measure which memorizes a speech recognition model for every command, and a calculating means which computes similarity of said sound and said speech recognition model of each, A selecting means which chooses said command to execute based on said computed similarity, Based on said similarity, it has a setting-out means to set a parameter used by processing corresponding to said selected command, and a processing means to perform processing corresponding to said command with said set parameter.

0009

Embodiment of the InventionEmbodiment 1 One example of this invention is described hereafter, referring to drawings.

0010 In the computer games (RPG, a fighting game, an action game, a breeding game, a simulation game, a puzzle game, etc.) for which drawing 1 used speech recognition, pass speech recognition, after a player utters game commands (a work name, magic, display conversion, etc.) -- using a flow chart for processing until the aforementioned game command is executed -- a table -- the bottom is a figure.

0011 In the aforementioned game, it has on a memory the recognized model dictionary D111 which stored the recognized model to all the commands and it which are used in a game. A player is provided with the list which stored the usable game command on a memory among the aforementioned recognized model dictionaries D111. For example, if it is during the battle of a game, it will have a list of game commands usable during a battle on a memory. In the game command list display processing step S101, a screen display of said game command list on a memory is performed.

0012 In the voice data acquisition step S102, a player chooses from a game command list and acquires the voice data about the uttered game command. In the characteristic quantity acquisition step S103, characteristic quantity is extracted from the aforementioned voice data. Furthermore by the acquisition step S104 of a recognized model, the recognized model of the game command in a game command list is acquired from said recognized model dictionary D111.

0013 In the similarity acquisition step S105, the similarity to said each recognized model of the characteristic quantity of the sound of a player is computed. In the command determination step

S106, the game command executed based on said each similarity is determined. In the command effect determination step S107, the effect of a game command is determined using said similarity. For example, the more similarity is high, the more let the effect of a game command be a large thing. A game command is executed in the command execution step S108. Furthermore at the speaker adaptation step S109 of a recognized model, speaker adaptation is performed to the aforementioned recognized model using the characteristic quantity of the sound of the inputted player.

0014 An example of speaker adaptation implementation is explained referring to drawing 2. The normal distribution function Z201 obtained by taking the statistics of the characteristic quantity of each game command from many persons' voice data expresses the aforementioned recognized model. Speaker adaptation is bringing the normal distribution function Z211 of the average sound built from many persons' sound close to the normal distribution function Z212 of the sound of a player based on the characteristic quantity of the sound of the inputted player.

0015 By the above, the more a player utters a game command, the more the normal distribution Z211 of the average sound built from many persons' sound and the normal distribution Z212 of a player sound approach. As a result, in order to locate the characteristic quantity of the sound of a player in the center of a normal distribution, similarity becomes large and the effect of the game command also becomes large.

Embodiment 2 Although the effect of the game command was based on the similarity of the determined command in the above-mentioned Embodiment 1, It is also possible to acquire the average of the similarity to the voice of the player before performing speaker adaptation a priori, to use the average of said similarity and to determine the game command effect in a game.

0016 The process in which the average of the similarity to the voice of a player before performing speaker adaptation in early stages of a game is acquired is explained referring to the flow chart of drawing 3. A recognized model is acquired in the acquisition step S201 of a recognized model. Here, let a recognized model be the phonemic model which modeled the phoneme. In the processing step S202 which gives the demand of utterance to a player, the display of various words and the sentence I get a player to utter on a screen is performed. In the acquisition processing step S203 of voice data, voice data is acquired from utterance of a player to the word and sentence which were displayed on said screen. In the feature extraction processing step S204 of voice data, the characteristic quantity of the sound to utterance of said player is extracted. In the similarity acquisition processing step S205 to a recognized model, the similarity of a recognized model is acquired from the characteristic quantity extracted at Step S204. It is judged whether a number sufficient in the amount determination step S206 of acquisition of similarity to issue the average of similarity of similarity was acquired. If sufficient similarity is not acquired, it returns to the processing step S202 which gives the demand of utterance to said player, and the aforementioned processing is repeated until a sufficient number of similarity is acquirable. If sufficient similarity is acquired, the average value of the similarity of a player will be acquired by the average value acquisition step S207 of similarity. The image of the average value over each recognized model is shown in drawing 4.

0017 Next, after the player in a game utters a game command, processing until a game command is executed is explained through speech recognition, referring to the flow chart of drawing 5. The flow chart of drawing 5 is fundamentally the same as that of above-mentioned drawing 1. In the command effect decision processing step S307, the places which use the average value of the similarity obtained from the average value acquisition processing step S207 of the similarity of drawing 3 differ. That is, let the difference of the average value of the similarity obtained from the similarity acquisition step S104 to a recognized model, and said similarity be a size of the game command effect in the command effect determination step S307.

Embodiment 3 In Embodiment 1 or Embodiment 2, although the game command was determined based on the recognized model dictionary, it is also possible to add a new game command by adding the following processing steps into a game (drawing 6).

0018 In the speaker adaptation level acquisition step S410, the speaker adaptation level in which it is shown which speaker adaptation followed is acquired. For example, a speaker adaptation level can be stopped, even if based on the distance of the medial axis (average value) of the normal distribution function Z212 of a player sound, and the medial axis (average value) of the normal distribution function Z201 of a recognized model. In the speaker adaptation level determination

step S412, it is judged to a threshold whether a speaker adaptation level is large. When a speaker adaptation level is small, processing is finished without doing anything (while speaker adaptation is not progressing). On the other hand, when a speaker adaptation level is large, in the command addition step S413, a game command is newly added to a game command list.

0019 Additional registration processing of a new game command is explained using the flow chart of drawing 8.

0020 In the acquisition step S701 of a new game command, a new game command is acquired in a text. In the processing step S702 which disassembles a text into a phoneme, the aforementioned game command acquired in the text is decomposed into a phoneme unit. The phonemic model to the aforementioned phoneme is acquired in the acquisition processing step S703 of a phonemic model. In the modern-construction processing step S704 of a game command, the recognized model to said game command is built by connecting said phonemic model. In the registration processing step S705 of a game command, the text and recognized model of said game command are registered into a recognized model dictionary. An image in case a player newly registers the magic a "fire" is shown in drawing 9.

Embodiment 4 It is also possible to add dignity to the model of the game command in Embodiment 1, and for recognition of a game command to carry out by adjusting dignity further, and to adjust easy and the difficulty of carrying out.

0021 It explains referring to the flow chart of drawing 7 for these contents below. In addition to a recognized model, the dignity to each model is acquired in the recognized model acquisition step S604. In the command determination step S606, the aforementioned dignity and the product of similarity are calculated and the value adopts the game command which became the largest as an execute command. For example, when the choice of a game command sets those of a "fire", a "sanding machine", and a "blizzard" with three, and each dignity to (Mf, Ms, Mb), Supposing the similarity to the sound of a player is (Pf, Ps, Pb), the product (F, S, B) of dignity and similarity will serve as F=MfxPf, S=MsxPs, and B=MbxPb. At this time, the game command of the largest value is used for an execute command among F, S, and B, and the effect of a game command uses the similarity at that time. As a result, since the value of dignity is small for example, although the product of similarity and dignity becomes small and the probability to recognize becomes low, since the value of similarity is large, the effect can make the work and magic that it is large.

Embodiment 5 It is also possible to determine the effect of the command in a game based on the similarity to the command model selected at random.

0022 In drawing 10, a player displays the selectable game command Z110 by the command choice displaying step S101. In the voice data acquisition processing step S102, a player chooses from said choices and acquires the voice data of the uttered game command. In the characteristic quantity extracting processing step S103, characteristic quantity is acquired from the above-mentioned voice data. In the acquisition processing step S104 of a recognized model, the recognized model of all the game commands on the game command list D812 is acquired. In the execute command decision processing step S805, the game command which the player uttered is recognized and an execute command is determined from the result. In the random selection process step S810 of a recognized model, one recognized model is chosen at random out of a command list. In the similarity acquisition processing step S811, the similarity of the recognized model selected at Step S805 at random and the characteristic quantity of the sound which the player extracted at Step S103 uttered is acquired. In the command effect decision processing step S107, the game command effect is determined using the similarity acquired at the similarity acquisition processing step S811. In the command execution processing step S108, the game command which the player chose at Step S805 is executed by the aforementioned command effect. Thereby, if the game command which the player chose, and the model selected at random are in agreement, similarity becomes high (the effect of a game command becoming large), and if it differs, similarity will serve as what is become low (the effect of a game command becomes small).

Embodiment 6 It is also possible to choose the determination of the command in a game and the effect of a command at random (drawing 11). The processing from the command choice display-processing step S101 to the recognized model acquisition processing step S104 is the same as said Embodiment 5. In the command random selection process step S820, the recognized model to one game command and game command is acquired from the list of commands. In the acquisition

processing step S821 of similarity, the effect of said command selected based on the sound which the recognized model and player of the command selected at Step S820 uttered at random is determined. In the command execution step S108, the game command selected at Step S820 at random is executed. one **namely,** of choices -- a correct answer -- it is (the sound and model of a player are in agreement). An element of its luck can be incorporated into a game, and a game can be played interesting -- do not understand which is a correct answer, but if it answers correctly well, the effect of a game command will become large, and the level of a game command goes up by speaker adaptation.

0023

Other embodiments Even if it applies this invention to the system which comprises two or more apparatus (for example, a host computer, an interface device, a reader, a printer, etc.), it may be applied to the devices (for example, a copying machine, a facsimile machine, etc.) which consist of one apparatus.

0024 The purpose of this invention the storage (or recording medium) which recorded the program code of the software which realizes the function of an embodiment mentioned above, It cannot be overemphasized that it is attained, also when a system or a device is supplied and the computer (or CPU and MPU) of the system or a device reads and executes the program code stored in the storage. In this case, the function of an embodiment which the program code itself read from the storage mentioned above will be realized, and the storage which memorized that program code will constitute this invention. By executing the program code which the computer read, Based on directions of the program code the function of an embodiment mentioned above is not only realized, but, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that the operating system (OS) etc. which are working on a computer are actual, and was mentioned above by the processing is realized.

0025 After the program code read from the storage was written in the memory with which the function expansion unit connected to the expansion card inserted in the computer or the computer is equipped, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that CPU etc. with which the expansion card and function expansion unit are equipped are actual, based on directions of the program code, and was mentioned above by the processing is realized.

0026 When applying this invention to the above-mentioned storage, the program code corresponding to the flow chart explained previously will be stored in the storage.

0027

Effect of the Invention As mentioned above, the game reflecting the individuality of the game player can be provided by this invention.

Field of the Invention This invention relates to the electronic game device which used speech recognition.

Description of the Prior Art Conventionally, JP,6-6175689,A, JP,9-173642,A, etc. are proposed as a device which operates based on voice input instructions. This device has taken in speech recognition technology that it should opt for operation using the similarity of the characteristic quantity of the result audio volume and loudness, and speech recognition's, and a user's sound, and the characteristic quantity of each sound in a voice dictionary, etc. For example, in the case of the robot type toy using speech recognition technology, it has opted for operation using the result of above-mentioned speech recognition, and similarity. For this reason, carrying out operation from which a robot type toy differs depending on the method of a user's utterance etc. can diversify how to use a toy. The game which took in speech recognition technology is also proposed.

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number etc. and a user operates, and the timing to which the difficulty of the game itself is changed were also dependent on the game program chiefly.
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Problem(s) to be Solved by the Invention This invention was made in order to solve an aforementioned problem, and an object of this invention is to provide the game reflecting the individuality of the game player.

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0011 In the aforementioned game, it has on a memory the recognized model dictionary D111 which stored the recognized model to all the commands and it which are used in a game. A player is provided with the list which stored the usable game command on a memory among the aforementioned recognized model dictionaries D111. For example, if it is during the battle of a game, it will have a list of game commands usable during a battle on a memory. In the game command list display processing step S101, a screen display of said game command list on a memory is performed.
0012 In the voice data acquisition step S102, a player chooses from a game command list and acquires the voice data about the uttered game command. In the characteristic quantity acquisition step S103, characteristic quantity is extracted from the aforementioned voice data. Furthermore by the acquisition step S104 of a recognized model, the recognized model of the game command in a game command list is acquired from said recognized model dictionary D111.
0013 In the similarity acquisition step S105, the similarity to said each recognized model of the characteristic quantity of the sound of a player is computed. In the command determination step S106, the game command executed based on said each similarity is determined. In the command

effect determination step S107, the effect of a game command is determined using said similarity. For example, the more similarity is high, the more let the effect of a game command be a large thing. A game command is executed in the command execution step S108. Furthermore at the speaker adaptation step S109 of a recognized model, speaker adaptation is performed to the aforementioned recognized model using the characteristic quantity of the sound of the inputted player.

0014 An example of speaker adaptation implementation is explained referring to drawing 2. The normal distribution function Z201 obtained by taking the statistics of the characteristic quantity of each game command from many persons' voice data expresses the aforementioned recognized model. Speaker adaptation is bringing the normal distribution function Z211 of the average sound built from many persons' sound close to the normal distribution function Z212 of the sound of a player based on the characteristic quantity of the sound of the inputted player.

0015 By the above, the more a player utters a game command, the more the normal distribution Z211 of the average sound built from many persons' sound and the normal distribution Z212 of a player sound approach. As a result, in order to locate the characteristic quantity of the sound of a player in the center of a normal distribution, similarity becomes large and the effect of the game command also becomes large.

Embodiment 2 Although the effect of the game command was based on the similarity of the determined command in the above-mentioned Embodiment 1, It is also possible to acquire the average of the similarity to the voice of the player before performing speaker adaptation a priori, to use the average of said similarity and to determine the game command effect in a game.

0016 The process in which the average of the similarity to the voice of a player before performing speaker adaptation in early stages of a game is acquired is explained referring to the flow chart of drawing 3. A recognized model is acquired in the acquisition step S201 of a recognized model. Here, let a recognized model be the phonemic model which modeled the phoneme. In the processing step S202 which gives the demand of utterance to a player, the display of various words and the sentence I get a player to utter on a screen is performed. In the acquisition processing step S203 of voice data, voice data is acquired from utterance of a player to the word and sentence which were displayed on said screen. In the feature extraction processing step S204 of voice data, the characteristic quantity of the sound to utterance of said player is extracted. In the similarity acquisition processing step S205 to a recognized model, the similarity of a recognized model is acquired from the characteristic quantity extracted at Step S204. It is judged whether a number sufficient in the amount determination step S206 of acquisition of similarity to issue the average of similarity of similarity was acquired. If sufficient similarity is not acquired, it returns to the processing step S202 which gives the demand of utterance to said player, and the aforementioned processing is repeated until a sufficient number of similarity is acquirable. If sufficient similarity is acquired, the average value of the similarity of a player will be acquired by the average value acquisition step S207 of similarity. The image of the average value over each recognized model is shown in drawing 4.

0017 Next, after the player in a game utters a game command, processing until a game command is executed is explained through speech recognition, referring to the flow chart of drawing 5. The flow chart of drawing 5 is fundamentally the same as that of above-mentioned drawing 1. In the command effect decision processing step S307, the places which use the average value of the similarity obtained from the average value acquisition processing step S207 of the similarity of drawing 3 differ. That is, let the difference of the average value of the similarity obtained from the similarity acquisition step S104 to a recognized model, and said similarity be a size of the game command effect in the command effect determination step S307.

Embodiment 3 In Embodiment 1 or Embodiment 2, although the game command was determined based on the recognized model dictionary, it is also possible to add a new game command by adding the following processing steps into a game (drawing 6).

0018 In the speaker adaptation level acquisition step S410, the speaker adaptation level in which it is shown which speaker adaptation followed is acquired. For example, a speaker adaptation level can be stopped, even if based on the distance of the medial axis (average value) of the normal distribution function Z212 of a player sound, and the medial axis (average value) of the normal distribution function Z201 of a recognized model. In the speaker adaptation level determination step S412, it is judged to a threshold whether a speaker adaptation level is large. When a speaker

adaptation level is small, processing is finished without doing anything (while speaker adaptation is not progressing). On the other hand, when a speaker adaptation level is large, in the command addition step S413, a game command is newly added to a game command list.

0019 Additional registration processing of a new game command is explained using the flow chart of drawing 8.

0020 In the acquisition step S701 of a new game command, a new game command is acquired in a text. In the processing step S702 which disassembles a text into a phoneme, the aforementioned game command acquired in the text is decomposed into a phoneme unit. The phonemic model to the aforementioned phoneme is acquired in the acquisition processing step S703 of a phonemic model. In the modern-construction processing step S704 of a game command, the recognized model to said game command is built by connecting said phonemic model. In the registration processing step S705 of a game command, the text and recognized model of said game command are registered into a recognized model dictionary. An image in case a player newly registers the magic a "fire" is shown in drawing 9.

Embodiment 4 It is also possible to add dignity to the model of the game command in Embodiment 1, and for recognition of a game command to carry out by adjusting dignity further, and to adjust easy and the difficulty of carrying out.

0021 It explains referring to the flow chart of drawing 7 for these contents below. In addition to a recognized model, the dignity to each model is acquired in the recognized model acquisition step S604. In the command determination step S606, the aforementioned dignity and the product of similarity are calculated and the value adopts the game command which became the largest as an execute command. For example, when the choice of a game command sets those of a "fire", a "sanding machine", and a "blizzard" with three, and each dignity to (Mf, Ms, Mb), Supposing the similarity to the sound of a player is (Pf, Ps, Pb), the product (F, S, B) of dignity and similarity will serve as F=MfxPf, S=MsxPs, and B=MbxPb. At this time, the game command of the largest value is used for an execute command among F, S, and B, and the effect of a game command uses the similarity at that time. As a result, since the value of dignity is small for example, although the product of similarity and dignity becomes small and the probability to recognize becomes low, since the value of similarity is large, the effect can make the work and magic that it is large.

Embodiment 5 It is also possible to determine the effect of the command in a game based on the similarity to the command model selected at random.

0022 In drawing 10, a player displays the selectable game command Z110 by the command choice displaying step S101. In the voice data acquisition processing step S102, a player chooses from said choices and acquires the voice data of the uttered game command. In the characteristic quantity extracting processing step S103, characteristic quantity is acquired from the above-mentioned voice data. In the acquisition processing step S104 of a recognized model, the recognized model of all the game commands on the game command list D812 is acquired. In the execute command decision processing step S805, the game command which the player uttered is recognized and an execute command is determined from the result. In the random selection process step S810 of a recognized model, one recognized model is chosen at random out of a command list. In the similarity acquisition processing step S811, the similarity of the recognized model selected at Step S805 at random and the characteristic quantity of the sound which the player extracted at Step S103 uttered is acquired. In the command effect decision processing step S107, the game command effect is determined using the similarity acquired at the similarity acquisition processing step S811. In the command execution processing step S108, the game command which the player chose at Step S805 is executed by the aforementioned command effect. Thereby, if the game command which the player chose, and the model selected at random are in agreement, similarity becomes high (the effect of a game command becoming large), and if it differs, similarity will serve as what is become low (the effect of a game command becomes small).

Embodiment 6 It is also possible to choose the determination of the command in a game and the effect of a command at random (drawing 11). The processing from the command choice display-processing step S101 to the recognized model acquisition processing step S104 is the same as said Embodiment 5. In the command random selection process step S820, the recognized model to one game command and game command is acquired from the list of commands. In the acquisition processing step S821 of similarity, the effect of said command selected based on the sound which

the recognized model and player of the command selected at Step S820 uttered at random is determined. In the command execution step S108, the game command selected at Step S820 at random is executed. one **namely,** of choices -- a correct answer -- it is (the sound and model of a player are in agreement). An element of its luck can be incorporated into a game, and a game can be played interesting -- do not understand which is a correct answer, but if it answers correctly well, the effect of a game command will become large, and the level of a game command goes up by speaker adaptation.

0023

Other embodiments Even if it applies this invention to the system which comprises two or more apparatus (for example, a host computer, an interface device, a reader, a printer, etc.), it may be applied to the devices (for example, a copying machine, a facsimile machine, etc.) which consist of one apparatus.

0024 The purpose of this invention the storage (or recording medium) which recorded the program code of the software which realizes the function of an embodiment mentioned above, It cannot be overemphasized that it is attained, also when a system or a device is supplied and the computer (or CPU and MPU) of the system or a device reads and executes the program code stored in the storage. In this case, the function of an embodiment which the program code itself read from the storage mentioned above will be realized, and the storage which memorized that program code will constitute this invention. By executing the program code which the computer read, Based on directions of the program code the function of an embodiment mentioned above is not only realized, but, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that the operating system (OS) etc. which are working on a computer are actual, and was mentioned above by the processing is realized.

0025 After the program code read from the storage was written in the memory with which the function expansion unit connected to the expansion card inserted in the computer or the computer is equipped, It cannot be overemphasized that it is contained also when the function of an embodiment which performed a part or all of processing that CPU etc. with which the expansion card and function expansion unit are equipped are actual, based on directions of the program code, and was mentioned above by the processing is realized.

0026 When applying this invention to the above-mentioned storage, the program code corresponding to the flow chart explained previously will be stored in the storage.

Brief Description of the Drawings

Drawing 1 It is a flow chart which shows the executive operation of the game command by the speech recognition concerning Embodiment 1 of this invention.

Drawing 2 It is a figure showing the relation of the characteristic quantity of voice inputting and similarity concerning Embodiment 1 of this invention.

Drawing 3 It is the flow chart which showed the process in which the average of the similarity to the voice of the player concerning Embodiment 2 of this invention was acquired.

Drawing 4 It is a figure showing an example of average value to each recognized model concerning Embodiment 2 of this invention.

Drawing 5 It is a flow chart which shows the executive operation of the game command by the speech recognition concerning Embodiment 2 of this invention.

Drawing 6 It is a flow chart which shows the execution and adding processing of a game command by the speech recognition concerning Embodiment 3 of this invention.

Drawing 7 It is a flow chart which shows the executive operation of the game command by the speech recognition concerning Embodiment 4 of this invention.

Drawing 8 It is a flow chart which shows additional registration processing of the new game command concerning Embodiment 3 of this invention.

Drawing 9 It is a schematic diagram showing additional registration processing for the new game command concerning Embodiment 3 of this invention.

Drawing 10 It is a flow chart which shows the executive operation of the game command by the speech recognition concerning Embodiment 5 of this invention.

Drawing 11 It is a flow chart which shows the executive operation of the game command by the

speech recognition concerning Embodiment 6 of this invention.

Description of Notations

S101 Command list displaying step
S102 voice-data acquisition step
S103 Characteristic quantity extraction step
S104 Similarity acquisition step
S105 recognized-model acquisition step
S106 Command determination step
S107 The command effect determination step
S108 command-execution step
S109 Speaker adaptation processing step
Z110 Command list
D111 recognized-model dictionary

Drawing 4

For drawings please refer to the original document.

Drawing 1

For drawings please refer to the original document.

Drawing 2

For drawings please refer to the original document.

Drawing 3

For drawings please refer to the original document.

Drawing 5

For drawings please refer to the original document.

Drawing 8

For drawings please refer to the original document.

Drawing 6

For drawings please refer to the original document.

Drawing 7

For drawings please refer to the original document.

Drawing 9

For drawings please refer to the original document.

Drawing 10

For drawings please refer to the original document.

Drawing 11

For drawings please refer to the original document.

For drawings please refer to the original document.

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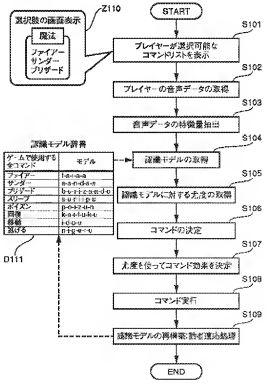
(54)【発明の名称】　電子ゲーム装置および電子ゲーム装置における処理方法

(57)【要約】
【課題】　ゲームプレイヤーの個性を反映したゲームを提供することを目的とする。
【解決手段】　プレイヤーから指示されたコマンドに従ってゲームを進行する電子ゲーム装置であって、前記コマンドを音声で受け付ける受付手段と、各コマンド毎の音声認識モデルを記憶する記憶手段と、前記音声と各々の前記音声認識モデルとの類似度を算出する算出手段と、算出した前記類似度に基づいて、実行する前記コマンドを選択する選択手段と、前記類似度に基づいて、選択した前記コマンドに対応する処理で用いるパラメータを設定する設定手段と、設定した前記パラメータにより前記コマンドに対応する処理を実行する処理手段とを備える。



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【特許請求の範囲】

【請求項１】　プレイヤーから指示されたコマンドに従ってゲームを進行する電子ゲーム装置であって、
前記コマンドを音声で受け付ける受付手段と、
各コマンド毎の音声認識モデルを記憶する記憶手段と、
前記音声と各々の前記音声認識モデルとの類似度を算出する算出手段と、
算出した前記類似度に基づいて、実行する前記コマンドを選択する選択手段と、
前記類似度に基づいて、選択した前記コマンドに対応する処理で用いるパラメータを設定する設定手段と、
設定した前記パラメータにより前記コマンドに対応する処理を実行する処理手段とを備えることを特徴とする電子ゲーム装置。

【請求項２】　前記選択手段は、
前記コマンドごとに算出された類似度のうち、類似度が最大となるコマンドを実行コマンドとして選択することを特徴とする請求項１に記載の電子ゲーム装置。

【請求項３】　プレイヤーからの音声に基づいて前記音声認識モデルを変更する変更手段を更に備えることを特徴とする請求項１に記載の電子ゲーム装置。

【請求項４】　プレイヤーからの音声に基づいて前記音声認識モデルを変更する変更手段を更に備えることを特徴とする請求項２に記載の電子ゲーム装置。

【請求項５】　前記音声認識モデルは、コマンドごとの重みを更に備え、
前記選択手段は、前記音声認識モデルのコマンドごとの重みと、前記算出手段により算出された類似度とに基づいて、コマンドを選択する重み付き選択手段を更に備えることを特徴とする請求項１に記載の電子ゲーム装置。

【請求項６】　前記音声認識モデルは、コマンドごとの重みを更に備え、
前記選択手段は、前記音声認識モデルのコマンドごとの重みと、前記算出手段により算出された類似度とに基づいて、コマンドを選択する重み付き選択手段を更に備えることを特徴とする請求項３に記載の電子ゲーム装置。

【請求項７】　前記選択手段は、前記音声認識モデルから無作為に抽出したコマンドを、選択された実行コマンドとして用いる無作為選択手段を更に備え、
前記設定手段は、前記無作為選択手段により無作為に抽出した音声認識モデルに対する類似度の値に基づいてパラメータを設定する無作為設定手段を更に備えることを特徴とする請求項１に記載の電子ゲーム装置。

【請求項８】　前記選択手段は、前記音声認識モデルから無作為に抽出したコマンドを、選択された実行コマンドとして用いる無作為選択手段を更に備え、
前記設定手段は、前記無作為選択手段により無作為に抽出した音声認識モデルに対する類似度の値に基づいてパラメータを設定する無作為設定手段を更に備えることを特徴とする請求項３に記載の電子ゲーム装置。

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【請求項９】　前記変更手段により変更された度合いを示す話者適応レベルを判断し、所定の話者適応レベルを超えたら、新たなゲームコマンドの追加を行う追加手段を更に備えることを特徴とする請求項３、請求項４、請求項６または請求項８のいずれか１つに記載の電子ゲーム装置。

【請求項１０】　前記算出手段は、プレイヤーごとの各コマンドの類似度の平均値をあらかじめ算出する平均値算出手段を更に備え、
前記設定手段は、前記平均値算出手段により算出された類似度の平均値と、前記算出手段により算出された類似度との差に基づいて、パラメータを設定することを特徴とする請求項２乃至請求項９のいずれか１つに記載の電子ゲーム装置。

【請求項１１】　プレイヤーから指示されたコマンドに従ってゲームを進行する電子ゲーム装置における処理方法であって、
前記コマンドを音声で受け付ける受付工程と、
各コマンド毎の音声認識モデルを記憶する記憶工程と、
前記音声と各々の前記音声認識モデルとの類似度を算出する算出工程と、
算出した前記類似度に基づいて、実行する前記コマンドを選択する選択工程と、
前記類似度に基づいて、選択した前記コマンドに対応する処理で用いるパラメータを設定する設定工程と、
設定した前記パラメータにより前記コマンドに対応する処理を実行する処理工程とを備えることを特徴とする電子ゲームにおける処理方法。

【請求項１２】　前記選択工程は、
前記コマンドごとに算出された類似度のうち、類似度が最大となるコマンドを実行コマンドとして選択することを特徴とする請求項１１に記載の電子ゲームにおける処理方法。

【請求項１３】　プレイヤーからの音声に基づいて前記音声認識モデルを変更する変更工程を更に備えることを特徴とする請求項１１に記載の電子ゲームにおける処理方法。

【請求項１４】　プレイヤーからの音声に基づいて前記音声認識モデルを変更する変更工程を更に備えることを特徴とする請求項１２に記載の電子ゲームにおける処理方法。

【請求項１５】　前記音声認識モデルは、コマンドごとの重みを更に備え、
前記選択工程は、前記音声認識モデルのコマンドごとの重みと、前記算出工程により算出された類似度とに基づいて、コマンドを選択する重み付き選択工程を更に備えることを特徴とする請求項１１に記載の電子ゲームにおける処理方法。

【請求項１６】　前記音声認識モデルは、コマンドごとの重みを更に備え、

前記選択工程は、前記音声認識モデルのコマンドごとの重みと、前記算出工程により算出された類似度とに基づいて、コマンドを選択する重み付き選択工程を更に備えることを特徴とする請求項１３に記載の電子ゲームにおける処理方法。

【請求項１７】　前記選択工程は、前記音声認識モデルから無作為に抽出したコマンドを、選択された実行コマンドとして用いる無作為選択工程を更に備え、
前記設定工程は、前記無作為選択工程により無作為に抽出した音声認識モデルに対する類似度の値に基づいてパラメータを設定する無作為設定工程を更に備えることを特徴とする請求項１１に記載の電子ゲームにおける処理方法。

【請求項１８】　前記選択工程は、前記音声認識モデルから無作為に抽出したコマンドを、選択された実行コマンドとして用いる無作為選択工程を更に備え、
前記設定工程は、前記無作為選択工程により無作為に抽出した音声認識モデルに対する類似度の値に基づいてパラメータを設定する無作為設定工程を更に備えることを特徴とする請求項１３に記載の電子ゲームにおける処理方法。

【請求項１９】　前記変更工程により変更された度合いを示す話者適応レベルを判断し、所定の話者適応レベルを超えたら、新たなゲームコマンドの追加を行う追加工程を更に備えることを特徴とする請求項３、請求項４、請求項６または請求項８のいずれか１つに記載の電子ゲームにおける処理方法。

【請求項２０】　前記算出工程は、プレイヤーごとの各コマンドの類似度の平均値をあらかじめ算出する平均値算出工程を更に備え、
前記設定工程は、前記平均値算出工程により算出された類似度の平均値と、前記算出工程により算出された類似度との差に基づいて、パラメータを設定することを特徴とする請求項２乃至請求項９のいずれか１つに記載の電子ゲームにおける処理方法。

【請求項２１】　請求項１１乃至請求項２０のいずれか１つに記載の電子ゲームにおける処理方法をコンピュータによって実現させるための制御プログラムを格納した記憶媒体。

【請求項２２】　請求項１１乃至請求項２０のいずれか１つに記載の電子ゲームにおける処理方法をコンピュータによって実現させるための制御プログラム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、音声認識を用いた電子ゲーム装置に関するものである。

【０００２】

【従来の技術】従来、音声入力指令に基づいて動作する装置として、特開平６－６１７５６８９、特開平９－１７３６４２などが提案されている。かかる装置は、音声の音量・声高、音声認識の結果およびユーザの音声の特徴量と音声辞書中の各音声の特徴量との類似度などを用いて動作を決定すべく音声認識技術を取り入れている。例えば、音声認識技術を用いたロボット型の玩具の場合、上述の音声認識の結果と類似度とを用いて動作を決定している。このため、ユーザの発声の仕方によってはロボット型の玩具が異なる動作をするなど、玩具の使い方を多様化させることが可能である。また、音声認識技術を取り入れたゲームも提案されている。

【０００３】しかし、ゲームにおけるコマンドの効果は、専らゲーム側で定められ、個々のプレイヤーの個性が反映されるものではなかった。

【０００４】例えば、従来のコンピュータゲームでは、ゲーム中のコマンド（技や魔法）の効果は、乱数などを用いて設定されており、また、ユーザの操作するキャラクタのレベルアップのタイミングや、ゲームそのものの難易度を変化させるタイミングも専らゲームプログラムに依存していた。

【０００５】具体的な例では、ＴＶゲームのＲＰＧでは、前記のコマンドの実行時の効果は、大体の範囲で決まっている。また、前記のキャラクタのレベルアップや難易度の変化のタイミングについては、ゲーム中にキャラクタの経験値を積算し、経験値がある値に達するとキャラクタのレベルが上がったり、新しい魔法やコマンドを覚えたりするなど、ゲームプログラムにのみ依存していた。

【０００６】このため、誰が操作しても、同じようなレベルアップの仕方、同じようなコマンドの効果になり、ゲーム展開において各プレイヤーのオリジナル性がでなかった。

【０００７】

【発明が解決しようとする課題】本発明は、上記課題を解決するためになされたもので、ゲームプレイヤーの個性を反映したゲームを提供することを目的とする。

【０００８】

【課題を解決するための手段】かかる課題を解決するため、例えば本発明の電子ゲーム装置は以下の構成を備える。すなわち、プレイヤーから指示されたコマンドに従ってゲームを進行する電子ゲーム装置であって、前記コマンドを音声で受け付ける受付手段と、各コマンド毎の音声認識モデルを記憶する記憶手段と、前記音声と各々の前記音声認識モデルとの類似度を算出する算出手段と、算出した前記類似度に基づいて、実行する前記コマンドを選択する選択手段と、前記類似度に基づいて、選択した前記コマンドに対応する処理で用いるパラメータを設定する設定手段と、設定した前記パラメータにより前記コマンドに対応する処理を実行する処理手段とを備える。

【０００９】

【発明の実施の形態】［実施形態１］以下、図面を参照

しながら本発明の一実施例を説明する。

【００１０】図１は、音声認識を用いたコンピュータゲーム（ＲＰＧ、格闘ゲーム、アクションゲーム、育成ゲーム、シミュレーションゲーム、パズルゲーム等）において、プレイヤーがゲームコマンド（技名・魔法・表示変換等）を発声してから、音声認識を経て、前記のゲームコマンドが実行されるまでの処理をフローチャートを用いて表した図である。

【００１１】前記のゲームでは、ゲームで使用する全コマンドとそれに対する認識モデルを格納した認識モデル辞書Ｄ１１１をメモリ上に備える。さらに、前記の認識モデル辞書Ｄ１１１のうち、プレイヤーが使用可能なゲームコマンドを格納したリストをメモリ上に備える。例えば、ゲームの戦闘中であれば、戦闘中に使用可能なゲームコマンドのリストをメモリ上に備える。ゲームコマンドリスト表示処理ステップＳ１０１では、メモリ上にある前記ゲームコマンドリストの画面表示を行う。

【００１２】音声データ取得ステップＳ１０２では、プレイヤーがゲームコマンドリストから選択し、発声したゲームコマンドについての音声データを取得する。特徴量取得ステップＳ１０３では、前記の音声データから特徴量を抽出する。さらに認識モデルの取得ステップＳ１０４では、前記認識モデル辞書Ｄ１１１からゲームコマンドリストにあるゲームコマンドの認識モデルを取得する。

【００１３】類似度取得ステップＳ１０５では、プレイヤーの音声の特徴量の前記各認識モデルに対する類似度を算出する。コマンド決定ステップＳ１０６では、前記各類似度に基づいて実行するゲームコマンドを決定する。コマンド効果決定ステップＳ１０７では、前記類似度を用いてゲームコマンドの効果を決定する。例えば、類似度が高ければ高いほどゲームコマンドの効果は大きいものとする。コマンド実行ステップＳ１０８では、ゲームコマンドの実行を行う。さらに認識モデルの話者適応ステップＳ１０９では、入力されたプレイヤーの音声の特徴量を用いて、前記の認識モデルに対して話者適応を行う。

【００１４】話者適応実施の一例を図２を参照しながら説明する。前記の認識モデルは、多数の人の音声データから各ゲームコマンドの特徴量を統計することによって得られる正規分布関数Ｚ２０１で表現する。話者適応とは、入力されたプレイヤーの音声の特徴量に基づいて、多数の人の音声から構築した平均的な音声の正規分布関数Ｚ２１１を、プレイヤーの音声の正規分布関数Ｚ２１２に近づけることである。

【００１５】以上により、プレイヤーがゲームコマンドを発声すればするほど、多数の人の音声から構築した平均的な音声の正規分布Ｚ２１１と、プレイヤー音声の正規分布Ｚ２１２とが近づく。この結果、プレイヤーの音声の特徴量が正規分布の中央に位置するようになるため、類似度が大きくなり、ゲームコマンドの効果も大きくなっていく。

［実施形態２］上記実施形態１では、ゲームコマンドの効果は決定されたコマンドの類似度に基づいていたが、事前に話者適応を行う前のプレイヤーの声に対する類似度の平均を取得し、ゲーム中に前記類似度の平均を用いてゲームコマンド効果を決定するようにすることも可能である。

【００１６】ゲーム初期の話者適応を行う前の、プレイヤーの声に対する類似度の平均を取得する過程を図３のフローチャートを参照しながら説明を行う。認識モデルの取得ステップＳ２０１では、認識モデルを取得する。ここでは認識モデルを、音素をモデル化した音素モデルとする。プレイヤーに発声の要求を出す処理ステップＳ２０２では、画面上にプレイヤーに発声してもらう様々な単語や文の表示を行う。音声データの取得処理ステップＳ２０３では、前記画面に表示した単語や文に対するプレイヤーの発声から音声データを取得する。音声データの特徴抽出処理ステップＳ２０４では、前記プレイヤーの発声に対する音声の特徴量を抽出する。認識モデルに対する類似度取得処理ステップＳ２０５では、ステップＳ２０４で抽出された特徴量より認識モデルの類似度を取得する。類似度の取得量判定ステップＳ２０６では、類似度の平均を出すのに充分な数の類似度を取得したかどうかの判定を行う。十分な類似度が取得されていなければ、前記プレイヤーに発声の要求を出す処理ステップＳ２０２まで戻り、十分な数の類似度が取得できるまで前記の処理を繰り返す。十分な類似度が取得されていれば、類似度の平均値取得ステップＳ２０７で、プレイヤーの類似度の平均値を取得する。各認識モデルに対する平均値のイメージを図４に示す。

【００１７】次にゲーム中のプレイヤーがゲームコマンドを発声してから、音声認識を経て、ゲームコマンドが実行されるまでの処理を図５のフローチャートを参照しながら説明する。基本的に図５のフローチャートは、上記の図１のフローチャートと同じである。コマンド効果決定処理ステップＳ３０７において、図３の類似度の平均値取得処理ステップＳ２０７から得られる類似度の平均値を使用するところが異なる。すなわちコマンド効果決定ステップＳ３０７では、認識モデルに対する類似度取得ステップＳ１０４から得られる類似度と前記類似度の平均値の差をゲームコマンド効果の大きさとする。

［実施形態３］実施形態１または実施形態２では、認識モデル辞書に基づいてゲームコマンドが決定されたが、ゲーム中において以下の処理ステップを加えることで、新たなゲームコマンドを追加することも可能である（図６）。

【００１８】話者適応レベル取得ステップＳ４１０では、話者適応がどれだけ進んだかを示す話者適応レベルを取得する。話者適応レベルは、例えば、プレイヤー音

声の正規分布関数Ｚ２１２の中心軸（平均値）と、認識モデルの正規分布関数Ｚ２０１の中心軸（平均値）との距離に基づいてもとめることが可能である。話者適応レベル判定ステップＳ４１２では、閾値に対し話者適応レベルが大きいかどうかを判定する。話者適応レベルが小さいときは（話者適応が進んでいないときは）、何もせずに処理を終える。一方、話者適応レベルが大きいときは、コマンド追加ステップＳ４１３において、ゲームコマンドリストに新たにゲームコマンドを追加する。

【００１９】新しいゲームコマンドの追加登録処理は図８のフローチャートを用いて説明する。

【００２０】新ゲームコマンドの取得ステップＳ７０１では、新しいゲームコマンドをテキストで取得する。テキストを音素に分解する処理ステップＳ７０２では、テキストで取得した前記のゲームコマンドを音素単位に分解する。音素モデルの取得処理ステップＳ７０３では、前記の音素に対する音素モデルを取得する。ゲームコマンドのモデル構築処理ステップＳ７０４では、前記音素モデルを繋ぐことにより前記ゲームコマンドに対する認識モデルを構築する。ゲームコマンドの登録処理ステップＳ７０５では、前記ゲームコマンドのテキストと認識モデルを認識モデル辞書に登録する。プレイヤーが「ファイアー」という魔法を新たに登録する場合のイメージを図９に示す。

［実施形態４］さらに、実施形態１におけるゲームコマンドのモデルに重みを付加し、重みを調整することによりゲームコマンドの認識のしやすさ・しにくさを調整することも可能である。

【００２１】かかる内容について以下に図７のフローチャートを参照しながら説明する。認識モデル取得ステップＳ６０４では、認識モデルに加えて、各モデルに対する重みを取得する。コマンド決定ステップＳ６０６では、前記の重みと類似度の積を計算し、その値が最も大きくなったゲームコマンドを実行コマンドとして採用する。例えば、ゲームコマンドの選択肢が「ファイアー」、「サンダー」、「ブリザード」の３つあり、それぞれの重みを（Ｍｆ、Ｍｓ、Ｍｂ）としたとき、プレイヤーの音声に対する類似度が（Ｐｆ、Ｐｓ、Ｐｂ）であるとすると、重みと類似度の積（Ｆ、Ｓ、Ｂ）は、Ｆ＝Ｍｆ×Ｐｆ、Ｓ＝Ｍｓ×Ｐｓ、Ｂ＝Ｍｂ×Ｐｂとなる。このとき実行コマンドは、Ｆ、Ｓ、Ｂのうち最も大きい値のゲームコマンドを採用し、ゲームコマンドの効果はそのときの類似度を用いる。この結果、例えば、重みの値が小さいために類似度と重みの積が小さくなり、認識する確率は低くなるものの、類似度の値が大きいため効果は大きいといった技や魔法を作ることができる。

［実施形態５］ゲーム中のコマンドの効果をランダムに選択したコマンドモデルに対する類似度に基づいて決定することも可能である。

【００２２】図１０においてコマンド選択肢表示ステップＳ１０１では、プレイヤーが選択可能なゲームコマンドＺ１１０を表示する。音声データ取得処理ステップＳ１０２では、プレイヤーが前記選択肢の中から選択し、発声したゲームコマンドの音声データを取得する。特徴量抽出処理ステップＳ１０３では、上記の音声データから特徴量を取得する。認識モデルの取得処理ステップＳ１０４では、ゲームコマンドリストＤ８１２上の全てのゲームコマンドの認識モデルを取得する。実行コマンド決定処理ステップＳ８０５では、プレイヤーが発声したゲームコマンドの認識を行い、その結果から実行コマンドを決定する。認識モデルのランダム選択処理ステップＳ８１０では、コマンドリストの中からランダムに１つの認識モデルを選択する。類似度取得処理ステップＳ８１１では、ステップＳ８０５でランダムに選択された認識モデルと、ステップＳ１０３で抽出したプレイヤーが発声した音声の特徴量との類似度を取得する。コマンド効果決定処理ステップＳ１０７では、類似度取得処理ステップＳ８１１で取得した類似度を用いてゲームコマンド効果を決定する。コマンド実行処理ステップＳ１０８では、ステップＳ８０５でプレイヤーが選択したゲームコマンドを、前記のコマンド効果で実行する。これにより、プレイヤーが選択したゲームコマンドと、ランダムに選択したモデルが一致すれば、類似度は高くなり（ゲームコマンドの効果が大きくなり）、異なっていれば、類似度は低くなる（ゲームコマンドの効果が小さくなる）こととなる。

［実施形態６］ゲーム中のコマンドの決定及びコマンドの効果をランダムに選択することも可能である（図１１）。コマンド選択肢表示処理ステップＳ１０１から認識モデル取得処理ステップＳ１０４までの処理は前記実施形態５と同じである。コマンドランダム選択処理ステップＳ８２０では、コマンドのリストより１つのゲームコマンドとゲームコマンドに対する認識モデルを取得する。類似度の取得処理ステップＳ８２１では、ステップＳ８２０で選択されたコマンドの認識モデルとプレイヤーが発声した音声に基づいてランダムに選択された前記コマンドの効果を決定する。コマンド実行ステップＳ１０８では、ステップＳ８２０でランダムに選択されたゲームコマンドを実行する。すなわち、選択肢のうちの１つが正解である（プレイヤーの音声とモデルが一致している）が、どれが正解なのかわからず、うまく正解するとゲームコマンドの効果が大きくなり、かつ話者適応によりゲームコマンドのレベルがあがるなど、ゲームに運の要素を取り込むことができ、ゲームをおもしろくすることができる。

【００２３】

【他の実施形態】なお、本発明は、複数の機器（例えばホストコンピュータ、インタフェイス機器、リーダ、プリンタなど）から構成されるシステムに適用しても、一つの機器からなる装置（例えば、複写機、ファクシミリ

装置など）に適用してもよい。

【００２４】また、本発明の目的は、前述した実施形態の機能を実現するソフトウェアのプログラムコードを記録した記憶媒体（または記録媒体）を、システムあるいは装置に供給し、そのシステムあるいは装置のコンピュータ（またはＣＰＵやＭＰＵ）が記憶媒体に格納されたプログラムコードを読み出し実行することによっても、達成されることは言うまでもない。この場合、記憶媒体から読み出されたプログラムコード自体が前述した実施形態の機能を実現することになり、そのプログラムコードを記憶した記憶媒体は本発明を構成することになる。また、コンピュータが読み出したプログラムコードを実行することにより、前述した実施形態の機能が実現されるだけでなく、そのプログラムコードの指示に基づき、コンピュータ上で稼働しているオペレーティングシステム（ＯＳ）などが実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【００２５】さらに、記憶媒体から読み出されたプログラムコードが、コンピュータに挿入された機能拡張カードやコンピュータに接続された機能拡張ユニットに備わるメモリに書込まれた後、そのプログラムコードの指示に基づき、その機能拡張カードや機能拡張ユニットに備わるＣＰＵなどが実際の処理の一部または全部を行い、その処理によって前述した実施形態の機能が実現される場合も含まれることは言うまでもない。

【００２６】本発明を上記記憶媒体に適用する場合、その記憶媒体には、先に説明したフローチャートに対応するプログラムコードが格納されることになる。

【００２７】

【発明の効果】以上のように、本発明により、ゲームプレイヤーの個性を反映したゲームを提供することができる。

【図面の簡単な説明】

【図１】本発明の実施形態１にかかる音声認識によるゲームコマンドの実行処理を示すフローチャートである。

＊【図２】本発明の実施形態１にかかる入力音声の特徴量と類似度との関係を示す図である。

【図３】本発明の実施形態２にかかるプレイヤーの声に対する類似度の平均を取得する過程を示したフローチャートである。

【図４】本発明の実施形態２にかかる各認識モデルに対する平均値の一例を示す図である。

【図５】本発明の実施形態２にかかる音声認識によるゲームコマンドの実行処理を示すフローチャートである。

【図６】本発明の実施形態３にかかる音声認識によるゲームコマンドの実行および追加処理を示すフローチャートである。

【図７】本発明の実施形態４にかかる音声認識によるゲームコマンドの実行処理を示すフローチャートである。

【図８】本発明の実施形態３にかかる新しいゲームコマンドの追加登録処理を示すフローチャートである。

【図９】本発明の実施形態３にかかる新しいゲームコマンドを追加登録処理を示す概略図である。

【図１０】本発明の実施形態５にかかる音声認識によるゲームコマンドの実行処理を示すフローチャートである。

【図１１】本発明の実施形態６にかかる音声認識によるゲームコマンドの実行処理を示すフローチャートである。

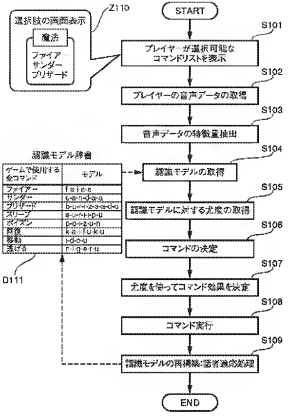
【符号の説明】

Ｓ１０１　コマンドリスト表示ステップ
Ｓ１０２　音声データ取得ステップ
Ｓ１０３　特徴量抽出ステップ
Ｓ１０４　類似度取得ステップ
Ｓ１０５　認識モデル取得ステップ
Ｓ１０６　コマンド決定ステップ
Ｓ１０７　コマンド効果決定ステップ
Ｓ１０８　コマンド実行ステップ
Ｓ１０９　話者適応処理ステップ
Ｚ１１０　コマンドリスト
Ｄ１１１　認識モデル辞書

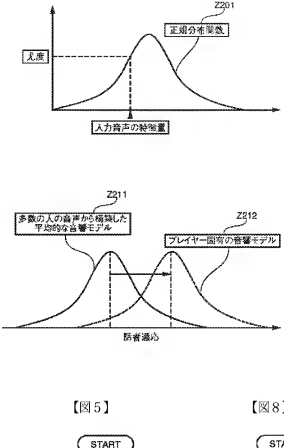
【図４】

音声のモデル	a	i	u	e	o	k	s	t	n	h	m	y
プレイヤーの尤度の平均	0.3	0.1	0.4	0.5	0.7	0.4	0.5	0.6	0.8	0.9	0.1	0.3

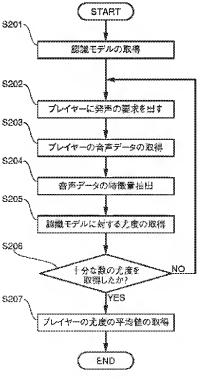
【図1】


START
Z110
選択肢の画面表示
魔法
ファイア
サンダー
ブリザード
S101
プレイヤーが選択可能な
コマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
S104
認識モデルの取得
S105
認識モデルに対する尤度の取得
S106
コマンドの決定
S107
尤度を使ってコマンド効果を決定
S108
コマンド実行
S109
認識モデルの再構築:話者適応処理
END
認識モデル辞書
ゲームで使用する全コマンド
モデル
ファイアー
f a i r e
サンダー
s a N d a a
ブリザード
b u r i z a a d o
スリープ
s u r i i p u
ポイズン
p o i z u n
解毒
k a i d o k u
脱出
d a s s y u
逃げる
n i g e r u
D111

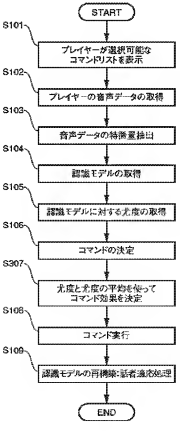
【図2】


Z201
正規分布関数
尤度
入力音声の特徴量
Z211
多数の人の音声から構築した
平均的な音響モデル
Z212
プレイヤー固有の音響モデル
話者適応

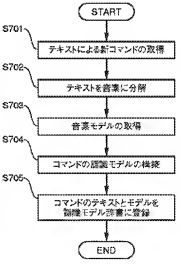
【図3】


START
S201
認識モデルの取得
S202
プレイヤーに発声の要求を出す
S203
プレイヤーの音声データの取得
S204
音声データの特徴量抽出
S205
認識モデルに対する尤度の取得
S206
分な数の尤度を
取得したか?
NO
YES
S207
プレイヤーの尤度の平均値の取得
END

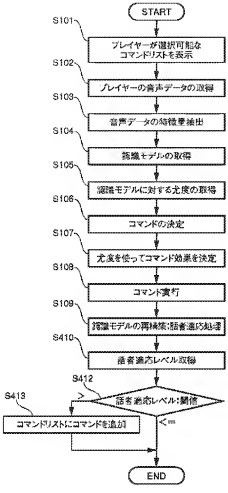
【図5】


START
S101
プレイヤーが選択可能な
コマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
S104
認識モデルの取得
S105
認識モデルに対する尤度の取得
S106
コマンドの決定
S307
尤度と尤度の平均を使って
コマンド効果を決定
S108
コマンド実行
S109
認識モデルの再構築:話者適応処理
END

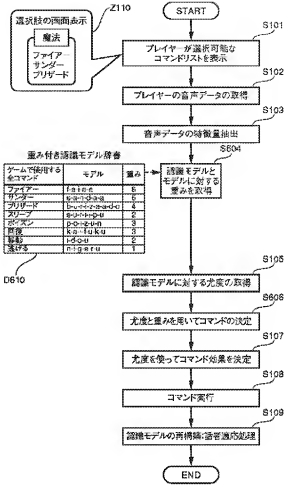
【図8】


START
S701
テキストによる新コマンドの取得
S702
テキストを音素に分解
S703
音素モデルの取得
S704
コマンドの認識モデルの構築
S705
コマンドのテキストとモデルを
認識モデル辞書に登録
END

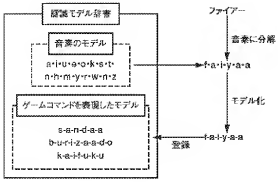
【図６】


START
S101
プレイヤーが選択可能なコマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
S104
認識モデルの取得
S105
認識モデルに対する尤度の取得
S106
コマンドの決定
S107
尤度を使ってコマンド効果を決定
S108
コマンド実行
S109
認識モデルの再構築:話者適応処理
S410
話者適応レベル取得
S412
話者適応レベル:閾値
S413
コマンドリストにコマンドを追加
END

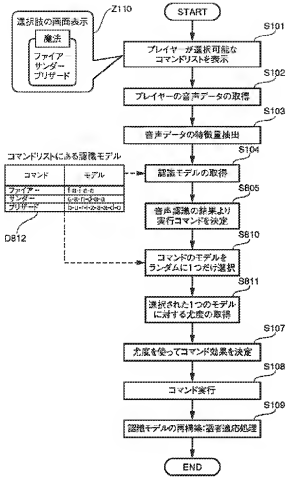
【図７】


選択肢の画面表示
魔法
ファイアー
サンダー
ブリザード
Z110
START
S101
プレイヤーが選択可能なコマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
S604
重み付き認識モデル辞書
ゲームで使用する全コマンド
モデル
重み
ファイアー
f-a-i-a
6
サンダー
s-a-N-d-a
6
ブリザード
b-u-r-i-z-a-d-o
4
スリープ
s-u-r-i-p-u
2
ポイズン
p-o-i-z-u-n
3
回復
k-a-i-f-u-k-u
3
撤退
t-a-i-s-e-N
2
逃げる
n-i-g-e-r-u
1
認識モデルと尤度に対する重みを取得
D610
S105
認識モデルに対する尤度の取得
S606
尤度と重みを用いてコマンドの決定
S107
尤度を使ってコマンド効果を決定
S108
コマンド実行
S109
認識モデルの再構築:話者適応処理
END

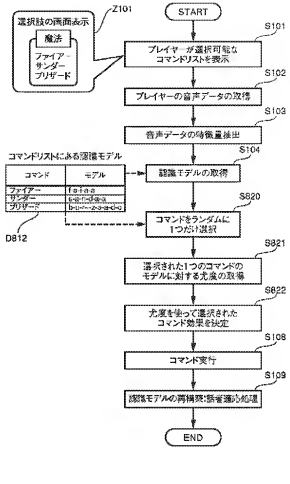
【図９】


認識モデル辞書
音素のモデル
a-i-u-e-o-k-s-t-
n-h-m-y-r-w-n-z
ゲームコマンドを表現したモデル
s-a-N-d-a-a
b-u-r-i-z-a-a-d-o
k-a-i-f-u-k-u
ファイアー
音素に分解
f-a-i-y-a-a
モデル化
f-a-i-y-a-a
登録

【図１０】


Z110
START
選択肢の画面表示
魔法
ファイアー
サンダー
ブリザード
S101
プレイヤーが選択可能なコマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
コマンドリストにある識種モデル
S104
コマンド
モデル
識種モデルの取得
ファイアー
サンダー
ブリザード
D812
S605
音声・環境の結果より実行コマンドを決定
S610
コマンドのモデルをランダムに1つだけ選択
S611
選択された1つのモデルに対する尤度の取得
S107
尤度を使ってコマンド効果を決定
S108
コマンド実行
S109
識種モデルの再構築・話者適応処理
END

【図１１】


Z101
START
選択肢の画面表示
魔法
ファイアー
サンダー
ブリザード
S101
プレイヤーが選択可能なコマンドリストを表示
S102
プレイヤーの音声データの取得
S103
音声データの特徴量抽出
コマンドリストにある識種モデル
S104
コマンド
モデル
識種モデルの取得
ファイアー
サンダー
ブリザード
D812
S620
コマンドをランダムに1つだけ選択
S621
選択された1つのコマンドのモデルに対する尤度の取得
S622
尤度を使って選択されたコマンド効果を決定
S108
コマンド実行
S109
識種モデルの再構築・話者適応処理
END